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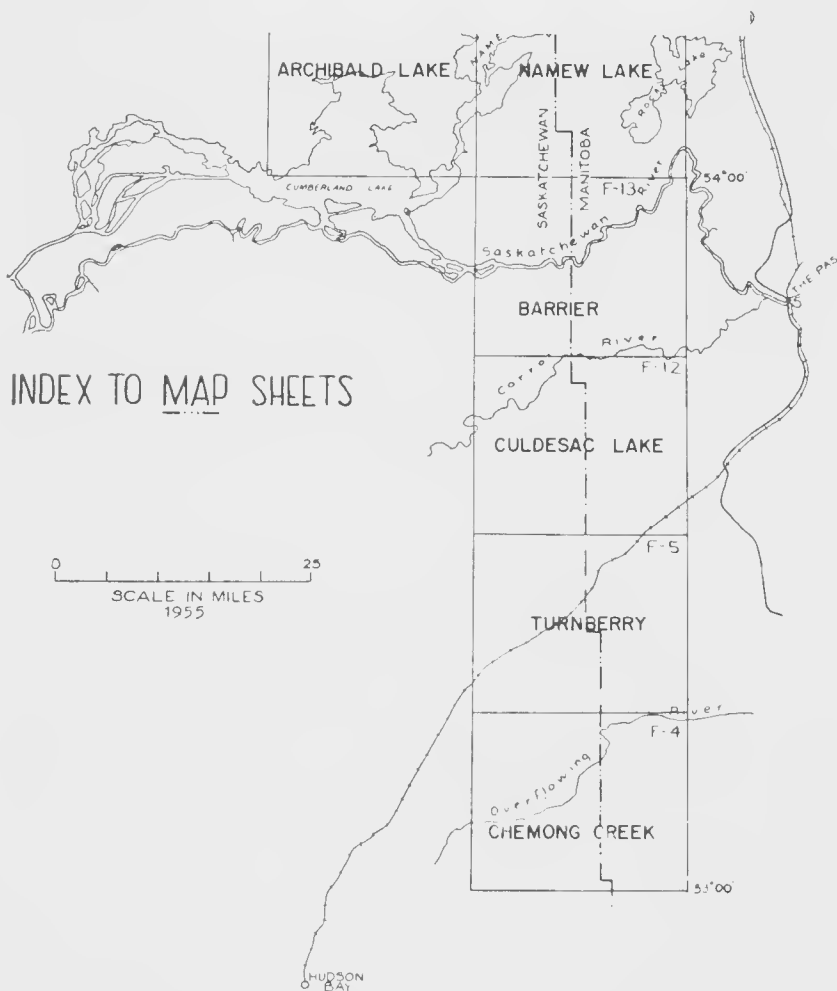
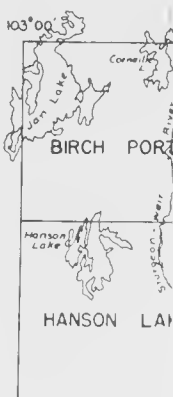
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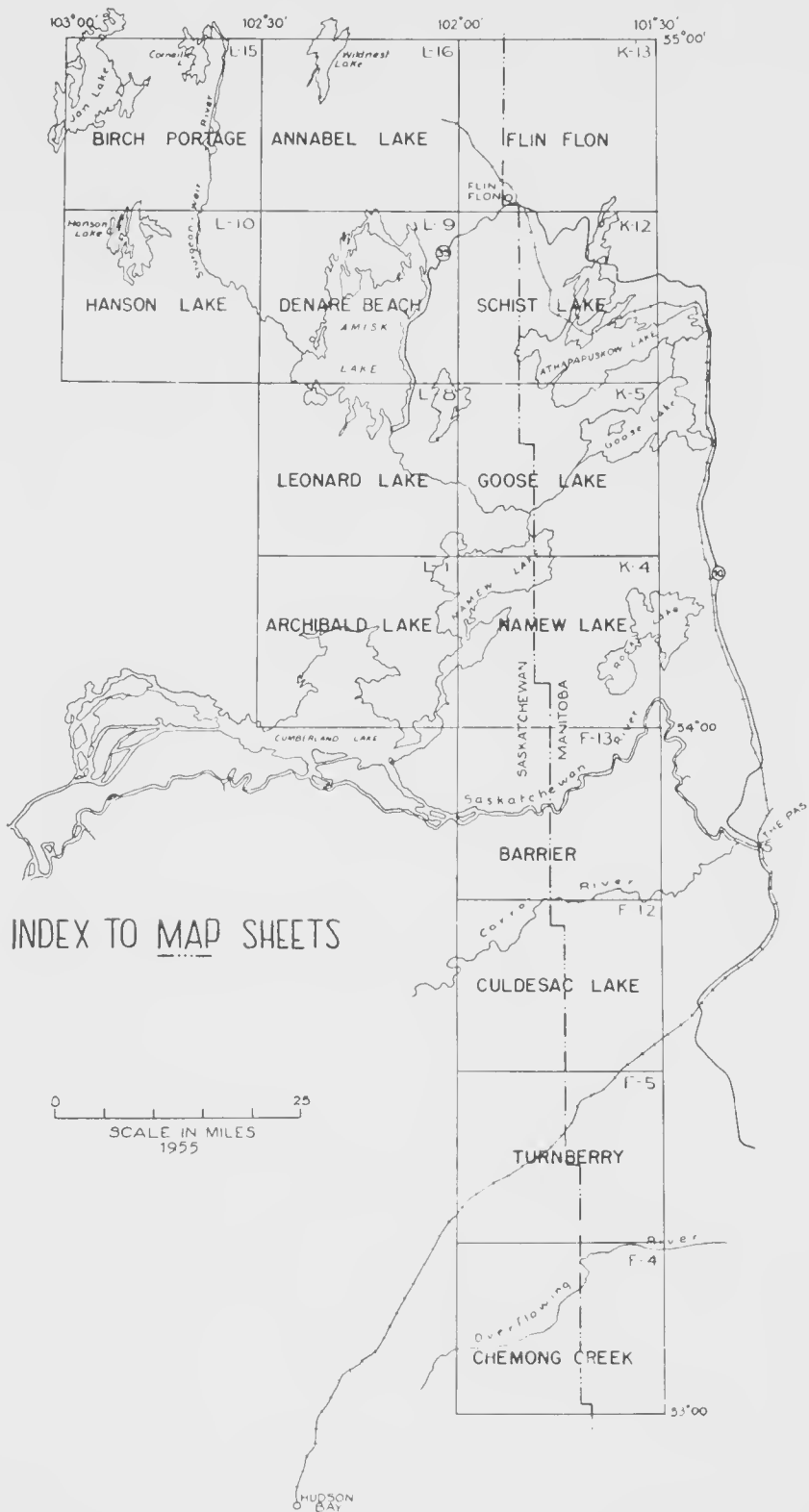
DEPARTMENT OF NATURAL RESOURCES
PROVINCE OF SASKATCHEWAN

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FOREST RESOURCES

of the

Cumberland Lake-Flin Flon
Area

Of Saskatchewan

Forest Inventory Series

Report No. 4

DEPARTMENT OF NATURAL RESOURCES
PROVINCE OF SASKATCHEWAN
1955

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manuscript.

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THE SASKATCHEWAN FOREST INVENTORY

The Cumberland Lake - Flin Flon Area is the fourth one to have been surveyed since 1947 by the Inventory Division of the Department of Natural Resources, Forestry Branch.

The cost of surveying this area has been shared by the Saskatchewan and Federal governments under The Canada Forestry Act.

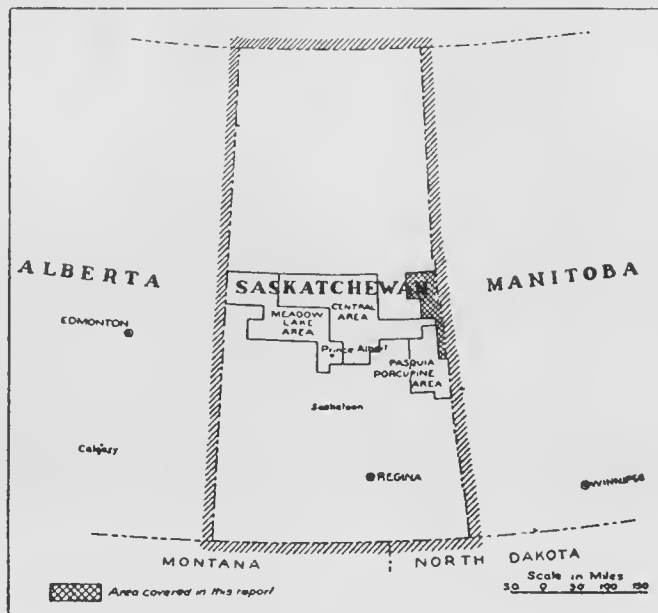
Statistics of Forest Inventory surveys are used to plan general forest policy as well as in the other types of surveys, such as are involved in management working circles, operating cruises, etc. Forest inventory has two main divisions of activity — the preparation of forest cover-type maps and the compilation of volume estimates for the areas surveyed.

The final form of an inventory map is a coloured, lithographed sheet on a one-inch-to-one-mile scale. One map sheet covers about 350 square miles and is the unit of area for the inventory statistics. Ninety-four such map sheets have been issued to date. This publication illustrates the second part of the work: the compilation and analysis of the statistical data. Every year since 1952 one report of this type has been published, and yet another on the Buffalo Narrows Area will appear in print next year.

The rate of growth of Saskatchewan's forests is also being investigated as still another phase in the work of the Forest Inventory Division.

Besides the regular inventory work, a northern reconnaissance survey has been completed on nearly 22,000 square miles between the 55th and 56th parallels. A similar survey is planned for 1955-56 on about 21,000 square miles between the 56th and 57th parallels.

To gain a better knowledge of forested areas and timber volumes on farm woodlots and lands outside the Provincial Forests, a settlement survey was carried out on about 18,000 square miles in the so-called "forest fringe" area.



Location of Survey Areas
Figure 1

THE CUMBERLAND LAKE - FLIN FLON AREA

(a) Geographic and Physical Features

The area covered in this report lies on the east-central side of Saskatchewan and occupies an axe-shaped area bordered on the east by the Manitoba boundary, on the north by the 55th degree of latitude, on the west by the 103rd meridian of longitude and a jagged line running south through Cumberland Lake to the 53rd parallel of latitude which forms its southern boundary. (See index to map sheets and Figure No. 1).

The entire area with the exception of the south half of map sheet F/4 —Chemong Creek - is enclosed in the Northern Provincial Forest. All save the three southern map sheets — Chemong Creek, Turnberry and Culdesac Lake—are in the Northern Administrative District. The latter three sheets are in the Hudson Bay District. The forest inventory survey cannot be restricted to the limits of a single administrative district but depends upon the availability and the coverage of base maps and aerial photos at the time the survey is made.

According to Mr. W. E. D. Halliday's classification, the forests of the Cumberland Lake - Flin Flon area are all within the Boreal Forest Region and include parts of two forest sections — the Manitoba Lowlands Section corresponding to the Palaeozoic Plain in the southern part, and the Northern Coniferous Section, corresponding to the Pre-Cambrian Shield in the northern part. In the former section lacustrine clays and sands of varying thickness form the soil, while in the latter soil-cover is thin and considerable bedrock is exposed.

A line running roughly east to west and crossing just north of the southern shore of Anisk (Beaver) Lake divides the area into two main physiographic units — the Pre-Cambrian Shield, which lies to the north



Photo No. 1. Due to the poor drainage, about one-third of the total area is a typical muskeg type with stunted black spruce and tamarack trees.

and gives rise to relatively uneven country of low, rounded hills, myriad lakes with irregular shorelines and many small islands; and the Palaeozoic Plain lying to the south. The latter is very level country and is covered with extensive swamps and muskegs (Photo No. 1) where rock exposures are few. Lakes in the Palaeozoic Plain have a much smoother shoreline and lack the many small islands and reefs.

The line of demarcation is most noticeable along the southern shore of Amisk Lake, where the large dolomite blocks, broken off by wave and ice action, form a distinct cliff. (Photo No. 2).



Photo So. 2. The soil here overlies limestone deposits and, despite its shallowness, exhibits a relatively high degree of productivity with regard to forest growth.

The area covered by the report is drained by a system of rivers and lakes to Lake Winnipeg: by the upper Sturgeon Weir River running through the north-western section to Amisk Lake, thence by the lower Sturgeon Weir to Cumberland Lake and from there to the Saskatchewan River by the Bigstone and Tearing Rivers.

Elevations range from 1,070 feet above sea level at Jan Lake in the north-west portion of the area to 871 feet above sea level at Cumberland House.

The climate of the area is sub-humid with a mean annual temperature of plus 36.6° F., an average January temperature of minus 8.7° F. and July temperature of plus 64.6° F.

Annual precipitation is 15.4 inches, almost three-quarters of which is recorded during the growing season from June to September.

The relatively short growing season of 100 frost-free days is balanced by the long summer growing days in these latitudes.

(b) History of the Area

The area covered by this report is significant, not only in the history of Saskatchewan, but also in that of Canada.

The first white settlement in what is now Saskatchewan was founded in 1774 on the south shore of Cumberland Lake (then Pine Island Lake) near the Saskatchewan River. The fort was built by Samuel Hearne. This was the first far-inland trading post of the Hudson's Bay Company and was established in answer to the activities of the rival fur traders from Montreal who were carrying trade goods into the Indian's own hunting ground and collecting his furs on the spot. Hitherto, for a hundred years past the company's posts had all been on or near the shores of Hudson Bay itself and the Indians came down the rivers and lakes of the interior to exchange their furs for the white man's guns, knives and kettles.

For more than a century and a half the route by the Saskatchewan River to Cumberland Lake thence by the Sturgeon Weir River and Amisk (Beaver) Lake to the Churchill River gave access to the rich fur country of the northern interior and the Mackenzie Basin.

Numerous historic sites have been found on Amisk (Beaver) Lake, the latest one being a fort, believed to have been erected in November 1775 by Alexander Henry and the Frobisher Brothers, on the west side of the lake below the Sturgeon Weir River. This was probably the counter move of the independent fur pedlars to the establishment of Cumberland House post by the Hudson's Bay Company the previous year. By uniting and forming a common front they hoped to compete more favourably with the ever increasing power of the Hudson's Bay Company. This marked the origin of the great North West Trading Company which for 30 years competed with the Hudson's Bay Company. It was not until 1821 that the differences between the two companies were reconciled and the name of the North West Trading Company disappeared into the name of the older establishment.

ECONOMIC CHARACTERISTICS

(a) Forest Harvesting

Forest industries with a production value of 159,000 dollars rank second to mining in gross product value in the Cumberland Lake - Flin Flon area, followed by commercial fishing and trapping.

Approximately 1.5 million board feet of spruce lumber and 2,000 cords of pulpwood are taken from the area annually. The principal locations of cutting are at Namew Lake and Maraiche Lake, on the islands in the north half of Amisk Lake and along the Denare Beach road:

The Hudson Bay Mining and Smelting Company, which has a management licence in the vicinity of Annabel Lake, cuts approximately 150,000 lineal feet of mining timber, 4,000 ties and 200 cords of fuelwood annually for its own use.

In addition, about 36,000 board feet of lumber and 5,000 lineal feet of building logs are cut under permits for private use, principally in the Denare Beach area.

Such a small production does not warrant large capital investments or the employment of expensive mechanical logging. Horse skidding to a small portable mill is, therefore, a common practice in the woods.

(Photo No. 3).



Photo No. 3. Horse skidding in the Cumberland Lake area.

The geographical location, factors of transportation and forest economy of this area favour a closer relationship with the nearby Manitoba centres than with the other parts of Saskatchewan. Forestry and forest utilization, therefore, have their own peculiar problems here.

The present population in this area is only about 2,100: two-thirds white, and one-third native. One half of the people are employed in mining and live in the town of Creighton or its vicinity. Fewer than 800 of them inhabit a territory of 3,000 square miles. Trapping and fishing are popular and are considered as their main occupations, while just a few seek employment in forestry.

Swampy areas in the south and rocky terrain in the north affect not only the growth and yield of the forest stands, but also the logging methods and cost of utilization. Forest stands are patchy, require a longer-than-average rotation period, and their volumes are comprised of trees of the smaller diameter groups. Another hindrance to profitable forest utilization for the time being is the high railroad freight rates. These are higher here than in any other area east of Prince Albert; though they are still lower than those of the Meadow Lake area.

As a result, the present drain of white spruce, black spruce and jack pine timber by cutting and fire amount to about 12,000 cords annually, or only 15% of the annual increment. However, with a further movement of wood-using factories toward their raw-material sources, an adjustment of freight rates and the employment of combined logging operations, this area may become one of the choice locations for forest utilization.

(b) Mining

It was not until after 1868, when the Northwest Territories were acquired by Canada, that any exploration not connected with the fur possibilities of the region took place.

The first geological reconnaissance of the area was made in 1940 by the Geological Survey of Canada, followed by mapping of the Amisk (Beaver) Lake area in the season of 1914, and eastward into Manitoba in 1915 and 1916.

Late in 1913 a gold-bearing quartz vein was found on the north-west shore of Amisk Lake. Interest in this area waned when little else was found, and the further discovery in 1915 of sulphide bodies on Flin Flon Lake and valuable copper deposits on the Manitoba side withdrew interest from the area entirely.

The building of the Flin Flon branch of the C.N.R. - Hudson Bay Railway in 1928, adjacent to this region, afforded easier access and consequently aided in the development of the area for mining. About 4,000 tons daily of copper-zinc ore are now hoisted on Saskatchewan's side of the border for the Hudson Bay Mining and Smelting Company at Flin Flon. Royalties from this operation average one and one-half million dollars annually.

After 1929, prospecting almost ceased due to the setting in of an economic depression and was not revived until 1934.

From 1934 until 1940, and again in 1946, extensive aerial mapping and a detailed survey was done in the area by the Geological Survey, Ottawa.

Several copper and gold deposits have been reported in the Amisk Lake - Hanson Lake area in the past two years, and one at Wildnest Lake. These have not as yet been exploited. New mines are currently being established at Birch Lake, and at the Coronation deposit six miles to the east.

Geologically the area is highly mineralized, but at present relatively undeveloped.



Photo No. 4. About 80% of the ore hoisted for the Flin Flon smelter comes from the Saskatchewan side of the border.

(c) Fishing and Trapping

Commercial fishing offers full or seasonal employment for about 80 residents of the area. Jan Lake, Mirond Lake, Corneille Lake, Hanson Lake, Amisk Lake and Cumberland Lake are providing the Saskatchewan Fish Marketing Service with up to 390 thousand pounds of whitefish, pickerel, northern pike, lake trout and sturgeon a year. The gross value of fishing is estimated at 66 thousand dollars annually.

The filleting plant at Denare Beach in the 1953 season processed 300 thousand pounds of fish from the area and fresh-packed 93 thousand pounds. As well, one million pounds of fish from other areas—Deschambault, Pelican Narrows, Reindeer and Wollaston Lakes — were fresh-packed here.

With the completion of the Lynn Lake - Kinoosao (Reindeer Lake) road, the fish from Wollaston and Reindeer Lakes formerly destined for Denare Beach will pass over that route.

Trapping is another occupation for 80 - 90 local people. Valuable furs worth about 30 thousand dollars are taken annually out of that area.

(d) Recreation

Amisk Lake is one of the most scenic lakes in Northern Saskatchewan. As yet virtually unexploited, the lake, with its countless wooded islands and many channels, offers excellent recreational facilities in the form of trout and pickerel fishing, boating, and bathing at Denare Beach.

The townsite of Denare Beach, on the north-east shore of the lake, has a summer population of about 150 families. Blocks have been laid out in the townsite area and surveyed lots are available for cottage sites. The many wooded islands in the north half of the lake also offer countless picturesque cottage sites.



Photo No. 5. A typical view of Amisk Lake.

FOREST AREA

Provincial Forests (including water) in the Cumberland Lake - Flin Flon area, as presented in this report, occupy 2.1 million acres. The forest land is equally divided between productive and non-productive with 775 thousand acres (or 36.9%) of the total Provincial Forests in each. (Table No. 1).

By non-productive forest land is meant land which is not capable of producing a forest crop of merchantable size within a reasonable period of time. The high proportion of non-productive forest land in the Cumberland Lake - Flin Flon area reflects the large acreages of treed muskegs (Photo No. 1) existing in the southern and central parts of the area and the treed rock in the north. (Photo No. 8).

Non-forested land, which includes open muskeg, brush land and open rock areas, occupies just 7.8% of the area.

Water occupies a relatively large proportion of the area: 18.4% of the total.

Of the productive forests, softwood cover-types predominate with 42.4% of the total. Mixedwood stands rank second with 33.4%, while hardwoods occupy only 15.7% of the productive forest area. Four-fifths of the softwood cover-type area is spruce, with only one-fifth jack pine.

Mature saw timber stands (available for immediate harvesting) occupy only 1.1% of the productive forest area. Fortunately, a much larger area of 129,000 acres (or 16.6%) of the third size-class stands is represented, where some utilization or stand-improvement cuttings can be carried out at the present time. (Photo No. 6).



Photo No. 6. Utilization in a form of stand-improvement cutting is recommended in these stands.

Stands in the second (or 30-to-50-foot) height range occupy the greatest proportion with 42.4% of the area. More than half (or 54.0%) of these are spruce stands.

AREA DISTRIBUTION

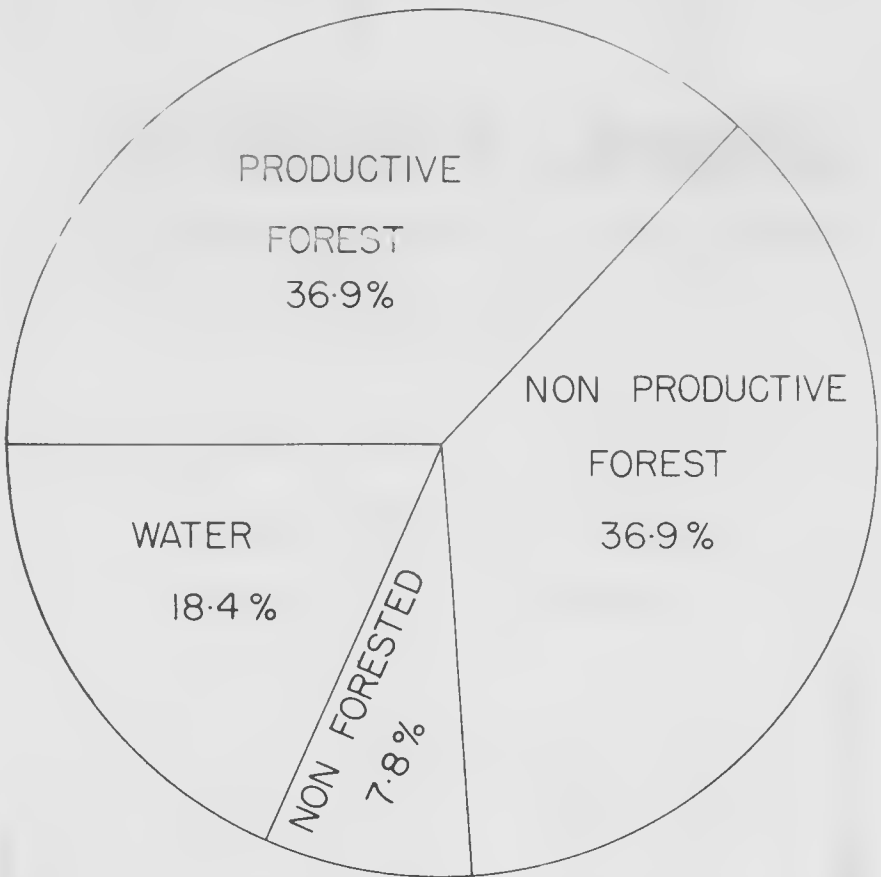
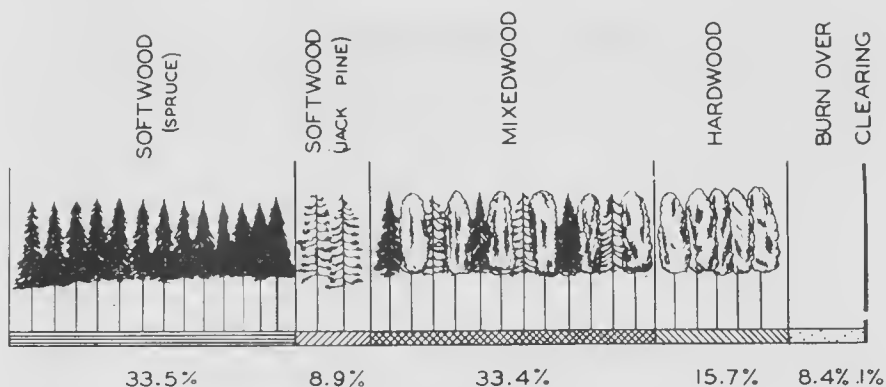


Figure 2 (Source table 1)

PRODUCTIVE FOREST AREA

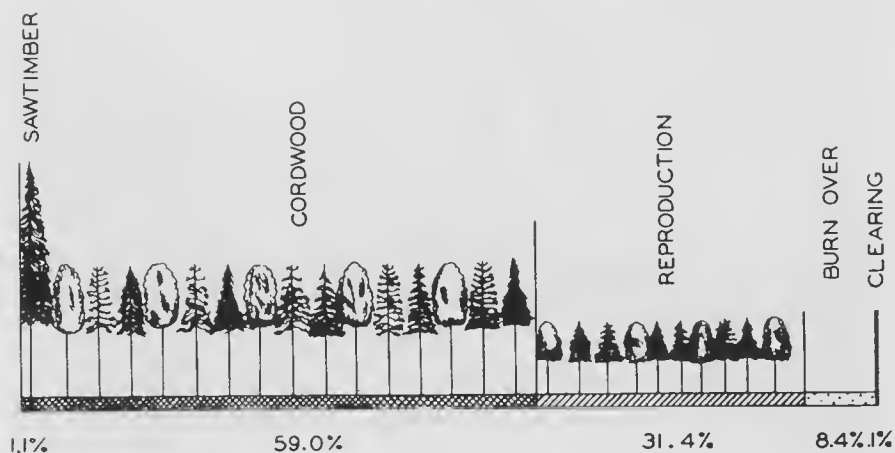
DISTRIBUTION BY COVER-TYPES



(Source Table 2)
Figure 3

PRODUCTIVE FOREST AREA

DISTRIBUTION BY SIZE-CLASSES



(Source Table 2)
Figure 4

TIMBER VOLUMES

(a) Saw Timber Volume

Saw timber volume is the volume in trees of 9.6 inches D.B.H. (diameter at breast height) and over regardless of stand size-class, expressed in board feet, Clark's International Log Rule, $\frac{1}{4}$ " kerf.

There are just under 590 million board feet of saw timber in trees 10 inches and over in this report area. (Table No. 4). Of this amount three-quarters or 429 million board feet are softwood, and one-quarter or 160 million board feet are hardwood on a volume basis.

The total volume of white spruce saw timber in this area is estimated at 297 million board feet, 214 million or almost three-quarters of which are in trees of 10-13 inches D.B.H.

In commercial stands of spruce, which in this report area will include a large proportion of third height-class stands as well as stands of the fourth height-class, there are 180 million feet of white spruce saw timber. If only trees in these two height classes and of 14 inches D.B.H. and over are considered, this volume is reduced to 75.5 million board feet. Some of this volume occurs in inaccessible areas or in such scattered stands that it cannot be economically cut. Subtracting such presently inaccessible volume further reduces the white spruce saw timber volume to just over 50 million board feet.

This illustrates some of the factors which must be considered when interpreting the values as given in this inventory report into practical working values.

SAWTIMBER VOLUME

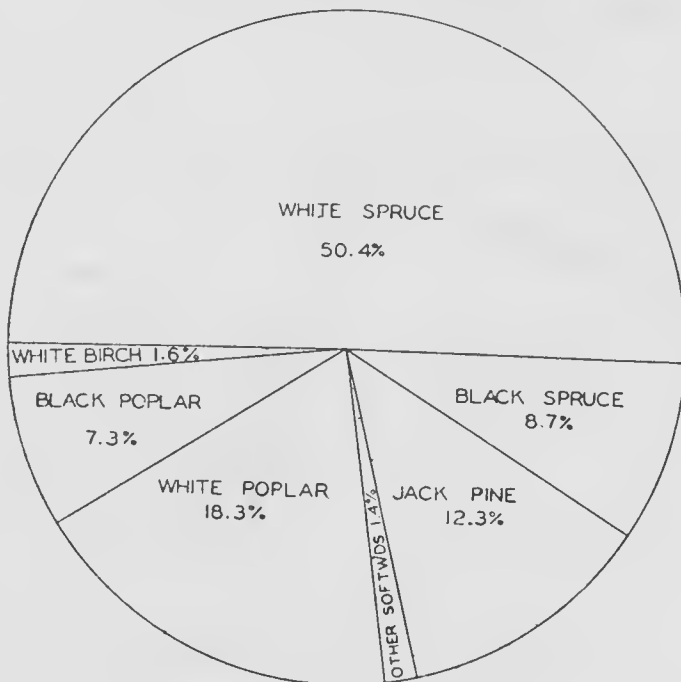


Figure 5 (Source table 4)

(b) Cordwood Volume

By cordwood volume is meant the volume of solid wood inside bark contained in trees 3.6 to 9.5 inches in diameter, expressed in standard cords of 128 cubic feet of stacked rough wood.

There are 5.6 million cords of wood in the diameter size-classes from 4 to 9 inches in the Cumberland Lake - Flin Flon area, with three-quarters of this being softwood.

Black spruce volume predominates in this diameter size-classification with almost one-half of the total softwood volume.

Jack pine and white spruce cordwood volumes are almost equally divided in the area with 18% and 17% of the total, respectively.
(Table No. 5).

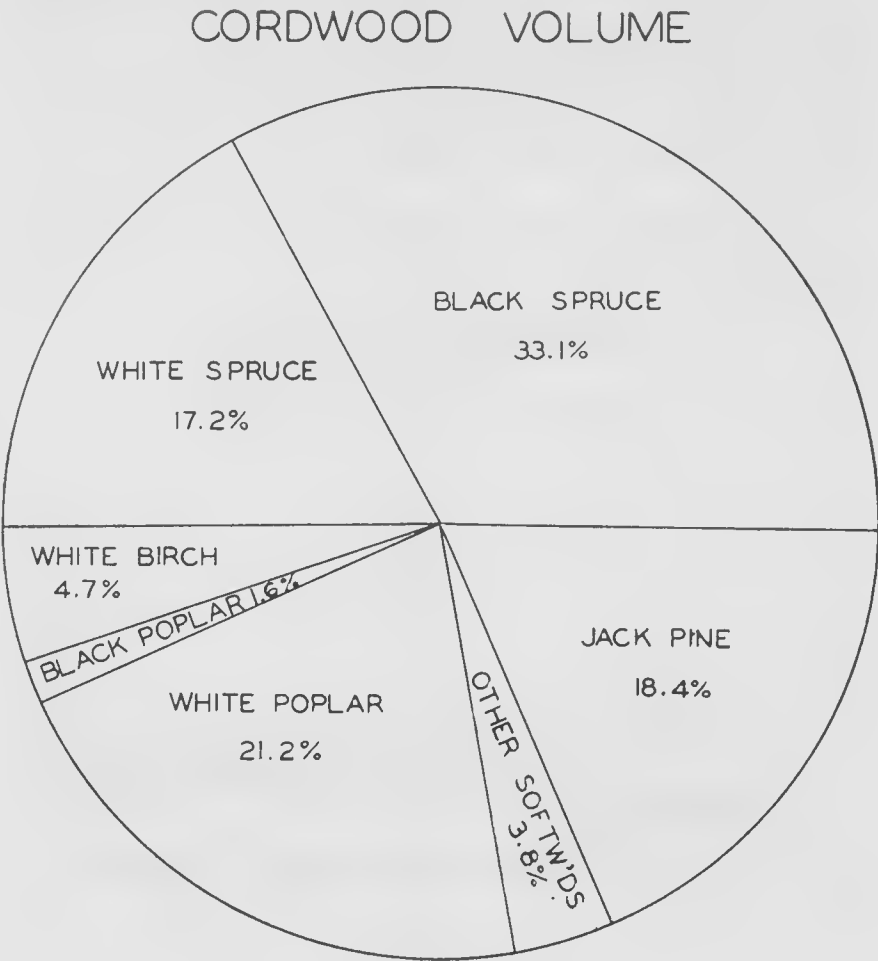


Figure 6 (Source table 5)

(c) Merchantable Cubic Foot Volume

There are 590 million cubic feet of merchantable wood in trees of 3.6 inches D.B.H. and up in the report area. (Table No. 6). Almost three-quarters of this volume is softwood, black and white spruce forming over half of the total wood volume in the area.

Black spruce is the leading species followed by white spruce. White poplar is the leading hardwood species ranking third behind white spruce for total volume.

Eighty-one per cent, or 478 million cubic feet of all species are found in the 4 to 9 inch group, while 111 million cubic feet are found in the trees of 10 inches D.B.H. and over.

This distribution of volume ordinarily indicates the predominance of younger stands, but in the Cumberland Lake - Flin Flon area this is not the case since age distribution studies reveal that 60% of the cubic foot volume in the area is found in stands 80 years and older. It does reflect the large proportion of black spruce on the area, 94% of the volume of which is concentrated in the 4 to 9 inch diameter size-class. It is also due to the overstocking or stagnation of forest stands on poorly drained or otherwise unfavourable sites. An evident consequent of the stand growing conditions is the proportions of volumes by species and diameter groups given in Table Nos. 4A and 6A.

IN TREES 4" - 9"
IN TREES 10" AND OVER

VOLUMES BY SPECIES AND SIZE-CLASSES

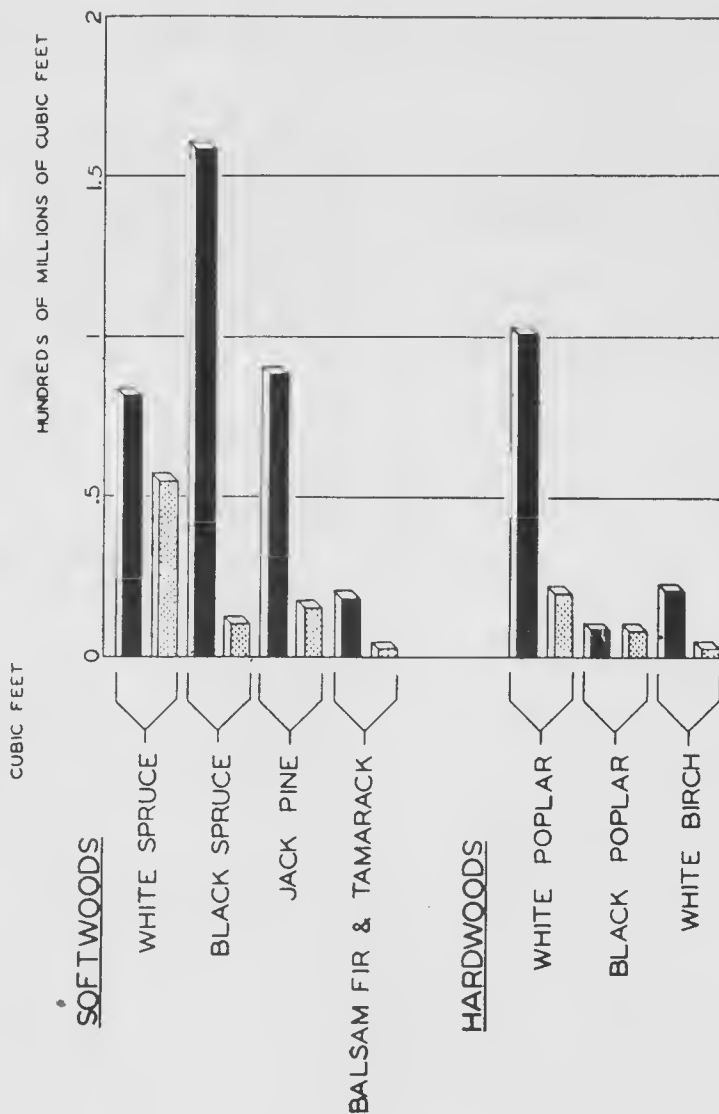


Figure 7. (Source Table 6)

CURRENT GROWTH

The statements on current growth are based on rates of growth as observed in a series of special growth studies, and adjusted to the actual stand conditions of each sub-type in the Cumberland Lake - Flin Flon area.

There are 709 thousand acres of productive forest land growing currently at the rate of 11 million cubic feet, or 15 cubic feet per acre, annually. Compared with the present growing stock, the current increment is 1.8% per year. Due to the poorer sites and growing conditions, the increment of this area is lower than that on other areas surveyed by the Inventory Division. No single species is putting on increment proportional to the fraction of the total volume it comprises. For instance, white spruce makes up 23.3% of the volume and puts on only 17.3% of the total current increment. Black spruce, with 28.7% of the total volume, has a current increment of 24.6%. Jack pine and white poplar are species on the ascendancy, comprising 17.5 and 20.4% of the volume on the area. They are putting on 22.9 and 24.8% of the current increment respectively.

About 9.6 million cubic feet, or 88%, of the total increment are on the smaller trees of 4 to 9 inches D.B.H., while 1.3 million cubic feet are on trees of 10 inches and over.

If forests are to be managed on a continuing basis, cutting must be adjusted to their growing capacity. In other words, the annual cut should be commensurate with the current increment and state of the growing stock. In this particular area, the present annual cut of all species is far below their increment, even after making allowances for losses due to forest fires and natural mortality. As a result, the volume of all tree species tends to increase, and so build up the stock. The heavy representation of older age classes (Table No. 10) is a result of this trend. If this build-up of stock is not halted or modified in the near future by human interference in the form of more intensive utilization, it will only be normalized ultimately by the rotations and natural mortality of the various trees species, with the consequential loss of wood volume.

Table No. 9 shows the distribution of the periodic annual increment by species and two large diameter groups. For practical convenience, the growth has been expressed in cubic feet, cords and board feet.

FIRE PROTECTION

Three primary, radio-equipped towers and one secondary wooden tower scan the horizons of the area for the smoke of forest fires. These are located at Meridian Creek on the east side of Amisk Lake, at Wildnest Lake - 25 miles north-west of Flin Flon—and at Deschambault. The wooden tower is situated at Cumberland House. These lookout towers in Saskatchewan together with the towers on the Manitoba side, provide the area with a fairly good fire-protection service.

Radio contact is maintained between these towers and the Conservation Officers at Denare Beach, Creighton and Cumberland House, thus enabling the quick dispatching of fire suppression crews to the forest fires reported. Water and air transportation provide the main means of reaching fires reported in the area. The Flin Flon - Denare Beach - Sturgeon and Weir River road offers access to the area adjacent to the east side of Amisk Lake.

As a precautionary measure a fireguard has been constructed which protects the townsite of Denare Beach from fires to the south.

The area burned per year ranges from 2,560 acres with a volume loss of 8,500 cords (as in 1952), to nil acreage or volume lost (as in 1954). The average annual loss over the period of 1947 to 1954 inclusive is 455 acres and about 2,200 cords of timber, mainly black spruce and jack pine. This annual loss is under the average for the whole province, comprising only 0.02% of the forest land area or 0.03% of the total timber stock. However, in the past, forest fires have left a powerful imprint on the character of the present forest stands. The composition of stands and natural succession of tree species have been modified and sometimes drastically changed. On peaty and deeper mineral soils the reproduction is satisfactory to good (Photo No. 7), while on the rocky and shallow soils, it is hampered or eliminated for many decades (Photo No. 8).



Photo No. 7. The deeper soils of the southern half of the Cumberland Lake - Flin Flon Area favour regeneration.



Photo No. 8. Repeated fires on the Pre-Cambrian Shield destroy the thin layer of soil and expose the rock.

**TABLE 1—Land Classification in the Cumberland
Lake - Flin Flon Area, 1954**

Class of Land	Amount In Acres	Per Cent of Provincial Forest Area
TOTAL AREA.....	2,119,427	
PROVINCIAL FORESTS, Total.....	2,101,278	100.0
LAND:		
Productive Forest.....	775,309	36.9
Non-productive Forest.....	774,734	36.9
Non-forested Land.....	164,533	7.8
WATER	386,702	18.4
ALL OTHER AREAS.....	18,149	
INDIAN RESERVE.....	18,149	

**TABLE 2—Areas of Productive Forest Land by Cover-Types and
Stand Size-Classes in Provincial Forests of the
Cumberland Lake - Flin Flon Area, 1954**

Cover-Type	Total		Stand Size-Class			
	Area in Acres	Per Cent Produc- tive Forests	Saw- timber Over 70 feet	Cordwood		Reproduc- tion Under 30 feet
				50 - 70 feet	30 - 50 feet	
Softwood	328,306					
Spruce	259,705	33.5	5,085	36,809	177,136	40,672
Pine	68,601	8.9		25,061	40,198	3,342
Mixedwood ...	258,961	33.4	2,813	46,391	58,672	151,085
Hardwood	121,921	15.7		20,665	52,969	48,287
All Cover Type s*	709,188		7,901	128,926	328,975	243,386
Per Cent		91.5	1.1	16.6	42.4	31.4

* Productive Forest Land of 775,309 acres (Table 1) also includes burn-overs 65,684 acres (8.4%) and cleared areas 437 (0.1%).

TABLE 3—Productive Forest Land Classification of the Cumberland Lake-Flin Flon Area by Map Sheets, 1954 (Acres)

Map Sheet	Total Area	Area in Provincial Forest							
		Total Provincial Forest Area *	Productive Forest Land					Burn-over and Clearing	
			Total Productive		Softwood		Mixed-wood		
			Acres	Per Cent	Spruce	Pine			Hardwood
63 F/4 Chemong Creek	139,610	139,610	19,981	14.3	3,983	—	9,690	2,171	4,137
63 F/5 Turnberry.....	129,696	129,696	13,838	10.6	7,542	—	4,230	1,462	604
63 F/12 Culdesac Lake.....	118,784	116,083	26,074	22.5	7,651	—	6,916	10,726	781
63 F/13 Barrier Lake.....	104,698	104,698	51,175	48.9	2,654	—	16,405	16,562	15,554
63 K/4 Nameaw Lake.....	91,712	91,712	36,628	39.9	9,460	899	13,631	4,854	7,784
63 K/5 Goose Lake.....	80,333	74,534	32,454	43.6	11,486	2,433	6,590	10,192	1,753
63 K/12 Schist Lake.....	68,512	68,512	26,988	39.4	10,808	1,030	11,216	3,856	78
63 K/13 Flin Flon.....	52,154	52,154	25,663	49.2	15,963	1,173	7,246	499	782
63 L/1 Archibald Lake.....	224,794	224,794	69,834	31.1	15,509	4,726	37,107	9,934	2,558
63 L/8 Leonard Lake.....	223,450	223,450	55,494	24.8	23,442	9,695	15,327	6,779	251
63 L/9 Denare Beach.....	222,093	217,014	103,798	47.8	33,496	7,847	33,105	29,234	116
63 L/10 Hanson Lake.....	222,093	222,093	100,777	45.4	41,034	13,678	26,300	7,020	12,745
63 L/15 Birch Portage.....	220,749	216,179	105,974	48.8	34,169	10,309	38,564	4,941	17,991
63 L/16 Annabel Lake.....	220,749	220,749	106,631	48.3	42,508	16,811	32,634	13,691	987
TOTALS	2,119,427	2,101,278	775,309	36.9	259,705	68,601	258,961	121,921	66,121

* Includes productive and non-productive forest, non-forested land and water.

TABLE 4—Sawtimber Volumes by Species and Stand Size-Classes in Provincial Forests of the Cumberland Lake - Flin Flon Area, 1954
(In thousands of board feet)

Species	In All Areas		In Sawtimber Area	In Cordwood Area
	Amount	Per Cent	Stands Over 70 feet high	Stands 30 to 70 feet high
TOTAL SAWTIMBER.....	589,498	100.0	91,274	498,224
Softwoods, total.....	429,248	72.8	73,946	355,302
White spruce.....	279,070	50.4	70,182	226,888
Black spruce.....	51,553	8.7	308	51,245
Jack pine.....	72,238	12.3	1,398	70,840
Balsam fir.....	4,012	0.7	2,058	1,954
Tamarack	4,375	0.7		4,375
Hardwoods, total.....	160 250	27.2	17,328	142,922
White poplar.....	107,778	18.3	12,609	95,169
Black poplar.....	43,334	7.3	4,034	39,300
White birch.....	9,138	1.6	685	8,453

TABLE 4A—Sawtimber Volume Distribution by Diameter Groups in the Cumberland Lake - Flin Flon Area
(In thousands of board feet)

Species	10 inches and over		10 & 11 inch class	12 & 13 inch class	14 inches and over
	Board feet	Per Cent			
ALL SPECIES.....	589,498 100.0%	100.0	296,184 50.2%	150,870 25.6%	142,444 24.2%
Softwoods, total.....	429,248 100.0%	72.8	226,574 52.8%	108,112 25.2%	94,562 22.0%
White spruce.....	297,070 100.0%	50.4	126,802 42.7%	87,343 29.4%	82,925 27.9%
Black spruce.....	51,553 100.0%	8.7	41,034 79.6%	6,792 13.2%	3,727 7.2%
Jack pine.....	72,238 100.0%	12.3	52,717 73.0%	12,168 16.8%	7,353 10.2%
Balsam fir.....	4,012 100.0%	0.7	2,264 56.4%	1,423 35.5%	325 8.1%
Tamarack	4,375 100.0%	0.7	3,757 85.9%	386 8.8%	232 5.3%
Hardwoods, total.....	160,250 100.0%	27.2	69,610 43.4%	42,760 26.7%	47,880 29.9%
White poplar.....	107,778 100.0%	18.3	51,447 47.7%	28,823 26.8%	27,508 25.5%
Black poplar.....	43,334 100.0%	7.3	12,290 28.4%	11,389 26.3%	19,655 45.3%
White birch.....	9,138 100.0%	1.6	5,873 64.3%	2,540 27.9%	717 7.8%

TABLE 5—Cordwood Volumes by Species and Stand Size-Classes in Provincial Forests of the Cumberland Lake - Flin Flon Area, 1954
(In thousands of cords)

Species	In All Areas		In Sawtimber area	In Cordwood Area	In Reproduc- tion area
	Amount	Per Cent	Over 70 feet	30 - 70 feet	Under 30 feet
TOTAL CORDWOOD...	5,628	100.0	56	5,077	495
Softwoods, total.....	4,078	72.5	45	3,763	270
White spruce.....	969	17.2	24	921	24
Black spruce.....	1,863	33.1	3	1,760	100
Jack pine.....	1,035	18.4	3	971	61
Balsam fir.....	106	1.9	15	90	1
Tamarack	105	1.9		21	84
Hardwoods total.....	1,550	27.5	11	1,314	225
White poplar.....	1,190	21.2	5	1,025	160
Black poplar.....	93	1.6	2	85	6
White birch.....	267	4.7	4	204	59

TABLE 6—Cubic Foot Volume by Species and Tree Diameter Groups Provincial Forests of the Cumberland Lake - Flin Flon Area, 1954
(In thousands of cubic feet)

Species	All diameters		Diameter groups	
	Amount	Per Cent	4 - 9 inches	10 inches and over
ALL SPECIES.....	589,919	100.0	478,437 81.1%	111,482 18.9%
Softwoods, total.....	429,722	72.8	346,679	83,043
White spruce.....	137,597	23.3	82,365	55,232
Black spruce.....	168,998	28.7	158,316	10,682
Jack pine.....	103,495	17.5	88,010	15,485
Balsam fir.....	9,826	1.7	9,049	777
Tamarack	9,806	1.7	8,939	867
Hardwoods, total.....	160,197	27.2	131,758	28,439
White poplar.....	120,611	20.4	101,140	19,471
Black poplar.....	14,965	2.5	7,919	7,046
White birch.....	24,621	4.2	22,699	1,922

TABLE 6A—The Volume and Influence of 4 - Inch Trees on the Volume of 4 - to - 9 - Inch Class in the Cumberland Lake - Flin Flon Area
(In thousands of cubic feet)

Species	Diameter Groups		
	4 - 9 inches	4 inch class alone	
		Amount	Per Cent
ALL SPECIES.....	478,437	64,963	13.6
Softwoods, total.....	346,679	48,469	14.0
White spruce.....	82,365	7,179	8.7
Black spruce.....	158,316	31,870	20.1
Jack pine.....	88,010	6,088	6.9
Balsam fir.....	9,049	1,485	16.4
Tamarack	8,939	1,847	20.7
Hardwoods, total.....	131,758	16,494	12.5
White poplar.....	101,140	11,161	11.0
Black poplar.....	7,919	1,054	13.3
White birch.....	22,699	4,279	18.6

TABLE 7—Average Volume per acre by Stand Size-Class and Tree Diameter Groups in Provincial Forests of the Cumberland Lake - Flin Flon Area, 1954

Stand Size-Class	All Diameters (cubic feet)	Diameter Groups (inches)	
		4 - 9 inches (cords)	10 inches and over (board feet)
ALL SIZE CLASSES.....	760	7.3	760
Sawtimber	2,704	7.1	11,552 *
Cordwood	1,150	11.1	1,088
Reproduction	172	2.0	

* This volume refers to specific stands on limited areas.

TABLE 8—Wood Volume in Provincial Forests of the Cumberland Lake - Flin Flon Area by Map Sheets, 1954

Map Sheet	Thousands of Board Feet			Thousands of Cords			Thousands of Cubic Feet		
	Total	Softwood	Hardwood	Total	Softwood	Hardwood	Total	Softwood	Hardwood
63 F /4 Chemong Creek.....	23,283	12,180	11,103	73	43	30	10,339	5,928	4,411
63 F /5 Turnberry.....	54,632	27,724	26,908	111	83	28	19,046	12,165	6,881
63 F/12 Cudlesac Lake.....	30,150	14,920	15,230	130	85	45	16,550	10,195	6,355
63 F/13 Barrier Lake.....	15,097	2,373	12,724	87	29	58	9,907	2,917	6,990
63 K/4 Namew Lake.....	17,722	14,793	2,929	146	92	54	15,765	10,658	5,107
63 K/5 Goose Lake.....	28,384	21,554	6,830	312	201	111	31,997	21,309	10,688
63 K/12 Schist Lake.....	21,906	15,653	6,253	233	151	82	24,000	15,887	8,113
63 K/13 Flin Flon.....	11,231	9,617	1,614	206	171	35	19,958	16,720	3,238
63 L/1 Archibald Lake.....	74,410	62,434	11,976	448	315	133	52,286	38,646	13,640
63 L/8 Leonard Lake.....	41,485	30,151	11,334	576	436	140	57,019	42,985	14,034
63 L/9 Denare Beach.....	91,282	66,506	24,776	970	620	350	99,391	65,154	34,237
63 L/10 Hanson Lake.....	34,889	70,315	14,574	899	702	197	92,725	73,262	19,463
63 L/15 Birch Portage.....	45,974	39,237	6,737	659	531	128	65,044	52,922	12,122
63 L/16 Annabel Lake.....	49,053	41,791	7,262	778	619	159	75,892	60,974	14,918
TOTALS.....	589,498	429,243	160,250	5,628	4,078	1,550	589,919	429,722	160,197

TABLE 9—Periodic Annual Volume Increment by Species and Tree Diameter Groups in the Cumberland Lake - Flin Flon Area, 1954

Species	All Diameters		Diameter Groups (inches)	
	Thousands of cubic feet	Per Cent	4 - 9 inches Thousands of cords *	10 inches and over Thousands of board feet **
ALL SPECIES.....	10,914	100.0	112.8	6,328
Softwoods, total.....	7,526	69.0	76.8	4,977
White spruce.....	1,887	17.3	15.2	2,955
Black spruce.....	2,683	24.6	30.0	680
Jack pine.....	2,500	22.9	26.4	1,285
Balsam fir.....	139	1.3	1.6	20
Tamarack	317	2.9	3.5	37
Hardwoods, total.....	3,388	31.0	36.0	1,651
White poplar.....	2,710	24.8	29.1	1,186
Black poplar.....	166	1.5	1.2	334
White birch.....	512	4.7	5.7	131

* Cubic feet converted to cords, basis 85 cubic feet equal to one cord.

** Cubic feet converted to board feet, basis one cubic foot equal to five board feet.

TABLE 10—Age-Class Distribution in the Cumberland Lake - Flin Flon Area, 1954

All Cover-types (Acres)	Age Class (years)						Total*
	1 - 20	21 - 40	41 - 60	61 - 80	81 - 100	101 and over	
	223,948	14,616	49,386	169,459	211,621	37,379	706,409
Per Cent.....	31.7%	2.1%	7.0%	24.0%	29.9%	5.3%	100.0%

* Does not include cut-over areas.

METHODS OF SURVEY

The use of aerial photos combined with comparative ground sampling is the basis of the survey. Summer verticals, at a scale of 1,320 feet to one inch taken in 1946 for map sheets L/10, L/15 and L/16 and in 1953 for the remaining map sheets, were used to outline the cover-type boundaries which were then transferred to base maps for area calculation and land classification.

Areas are measured by the dot-count method and their estimates given in this report are based on 100% air-photo coverage of the survey area.

Forest stands on the productive land are classified into four cover-types: Hardwood, Softwood-spruce type, Softwood-jack pine type and Mixedwood. Each cover-type is divided further into four density levels, based on per cent of tree crown closure, and four height-classes according to the average height of dominant stand. This stand classification brings the number of forest sub-types up to 64. Stands with less than 25% of hardwood or softwood by volume are called pure stands, while all other variations have been included in the mixedwood cover-type.

To determine volume, 1/5th acre sample plots were located at random or along random lines in representative cover-types. The forest classification used enables the sampling at different intensities of each stratum to the degree necessary to come within the required standards of sampling error. The sampling results of the representative sub-types were applied to the whole sub-type area to produce the estimates in terms of net merchantable volume. The volume in forest inventory statistics is calculated separately for each species and expressed in cubic feet and cords for trees from 4 to 9 inches D.B.H. and in cubic feet and board feet for trees 10 inches and over.

There were 225 sample plots located and measured in the summer of 1953. In addition, some 469 sample plots from growth and other surveys of similar areas were used to strengthen the applied stand tables.

Local tree-volume tables were prepared from appropriate standard volume tables and checked against the volume of randomly cut taper trees and their sectional volume measurements. The same taper tree measurements provided data for cull reductions.

To supplement inventory volume measurements and to determine the degree and state of reproduction of younger stands, random lines were run in the first height-class areas. These were 1/50-acre plots, each consisting of 20 milacre quadrats, with a lineal espacement of eight chains.

Growth data for the Softwood-spruce type, the Hardwood and the Mixedwood cover-types were obtained from stand-density yield tables constructed on the measurements of 326 one-fifth acre permanent sample plots. For the Softwood-jack pine cover-type, the growth was determined by the increment boring method, based on 715 one-tenth acre plot measurements and 2,000 increment borings. The growth of black spruce stands was calculated from special growth-and-yield tables for this species, based on 150 one-fifth acre permanent sample plots.

ACCURACY OF DATA

Inaccuracies in the Forest Inventory estimates may arise from such sources as errors in the classification of forest stands, both in photo interpretation and in the field survey; in the collection of data in the field, and in the compilation of the measurement data. Another source of error is in the intensity of sampling, measured and expressed as the sampling error. It is a theoretical measure of the reliability of estimates based on the variability of sample measurements.

Care was taken to maintain a uniformity of standards so as to minimize the human errors in photo classification, plot sampling, construction of local volume tables, stand tables, cull factors, etc. Sample plots with more than twice the standard deviation in volume were rejected, while the criterion of suitability for local volume tables was an aggregate difference of close to 1%, and an average deviation of less than 10%.

Statistical analysis showed that the pooled sampling error for 92.5% of the total cubic foot volume (the volume contained in cover types of the 2nd, 3rd and 4th height-class) was plus or minus 2.4%. Such a statement means that the total merchantable volume in the area is within plus or minus 2.4% of the stated volume (barring errors in measurement) two chances out of three. As, however, the percentage error increases with each subdivision of the total, the reliability of volume estimates for smaller areas or each sub-type is considerably reduced. This sampling error applies to 459 thousand acres or 65% of the total productive forest area.

A fairly low percentage (0.01%) of the total forested area was cruised in sampling, but the accuracy of the volume estimates has been improved by strengthening the stand tables with measurements from other surveys, by dividing the forests into 64 homogeneous sub-types and by varying the intensity of sampling within these groups. Greater stress has been put on the commercial cover-types.

In all cases the results of the special growth studies were adjusted to fit the actual stand tables of the inventory volume sampling in each sub-type.

Area estimates have no sampling error as the area was covered by complete aerial survey.

DEFINITION OF TERMS

Area Classification

Forest Land Area

Productive Forest—Land which will produce a forest crop of merchantable size and form within a reasonable period of time.

Non-productive Forest—Land incapable of producing a forest crop of merchantable size within a reasonable period of time. Includes treed muskegs, treed rock and a proportion of softwood stands judged to be stagnant.

Non-forested—Includes open swamps, grassland, brush, rock, cultivated land and urban areas.

Stand Size-Classes

Saw Timber Area—Stands over 70 feet in height.

Cordwood Area—Stands averaging 30 to 70 feet in height.

Reproduction Area—Stands under 30 feet in height.

Covers-Types

Softwood—Stands containing over 75% softwoods by volume.

Mixedwood—Stands in which neither softwoods nor hardwoods constitute 75% of the stand volume.

Hardwood—Stands containing over 75% hardwoods by volume.

Merchantability

Merchantable—Stands over 30 feet in height.

Young Growth—Stands on productive forest land under 30 feet in height.

Volume Classification

Saw Timber—Volume contained in trees 9.6 inches and over (diameter breast high) regardless of stand size-class in which they occur, expressed in board feet, Clark's International Log Rule, $\frac{1}{4}$ " kerf.

Cordwood—Volume of solid wood inside bark contained in trees 3.6 to 9.5 inches in diameter, expressed in standard cords of 128 cubic feet of stacked rough wood.

Cubic foot volume—Volume of solid wood inside bark of all trees 3.6 inches in diameter and over.

Limits of merchantability:

For Saw Timber—Stump one foot, variable top diameter inside bark averaging 6 inches.

For Cordwood—Stump one foot, top diameter inside bark 3 inches.

Net merchantable volume—Merchantable volume of sound wood. Deductions for cull based on averaged measurements of felled sample trees. Volumes in this report area net merchantable unless otherwise noted.

Gross merchantable volume—Merchantable volume with no deductions for cull made, in cases where reliable cull factors are not yet available.

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ONE WEEK LOAN

LIST OF SPECIES

			Tree Symbol
Softwoods			
White spruce	—	<i>Picea glauca</i> (Moench.) Voss	wS
Black spruce	—	<i>Picea mariana</i> (Mill.) B.S.P.	bS
Jack pine	—	<i>Pinus Banksiana</i> - Lamb.	jP
Balsam fir	—	<i>Abies balsamea</i> (L.) Mill.	bF
Tamarack	—	<i>Larix Laricina</i> (Du Roi) K. Koch	tL
Hardwoods			
White poplar	—	<i>Populus tremuloides</i> - Michx.	tA
Black poplar	—	<i>Populus balsamifera</i> - L.	bPo
White birch	—	<i>Betula papyrifera</i> - Marsh.	wB

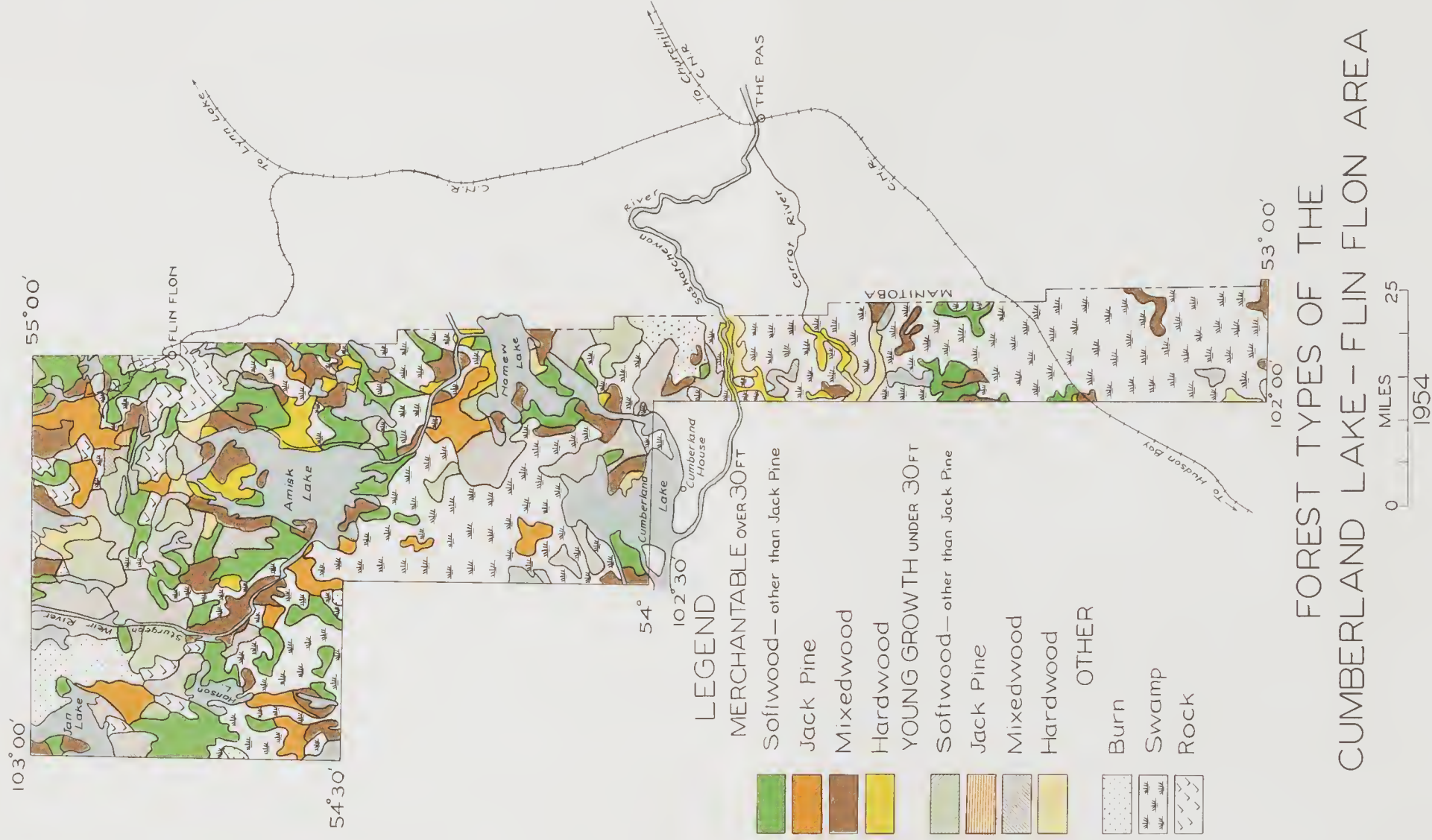
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ONE WEEK LOAN



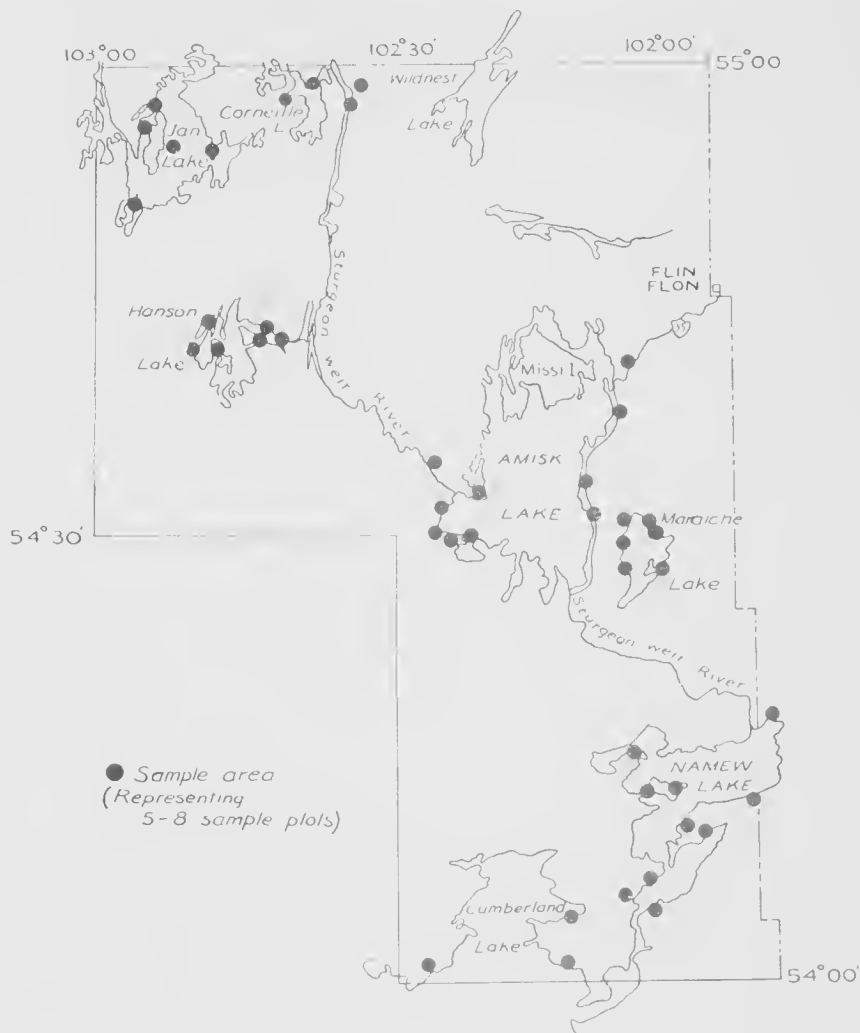
FOREST TYPES OF THE
CUMBERLAND LAKE - FLIN FLON AREA

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CUMBERLAND LAKE - FLIN FLON AREA SAMPLE AREAS

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